# PHASE ONE: BREAK DOWN
## BUBBLE BATTLES

**Mission:** What combination produces the most bubbles?

**Age:** 8+
**Materials:** $19

**Time:** 30 min
(Set-up: 10 min | Activity: 15 min | Clean-up: 5 min)

**Safety Note: Grownups, supervise children so they do not accidentally inhale powdered detergent. If detergent comes into contact with eyes, flush with plenty of water.**

### What you need:

**Materials:**
- 1 cup distilled water, found in the bottled water section
- 1/4 tsp. Epsom salt
- 3/4 tsp. powdered laundry detergent containing aluminosilicates (like Tide)
- 3/4 tsp. of bar soap without EDTA, grated (like Ivory)

**Equipment:**
- 4 small jars with lids, like baby food jars
- Measuring cup
- Measuring spoons
- Marker
- Masking tape

### What to do:

1. Using a marker and labeling tape, label your jars. Two will start with "S" for "soft" water and two will start with "H" for "hard" water. We call distilled water "soft" because it doesn't have any minerals in it and hard water "hard" because it's loaded with minerals, like salt. Then in each pair, label one with "S" for "soap" and one with "D" for "detergent". Your jars will be labeled like this: "SS", "SD", "HS" and "HD."

2. Soft Water Bubble Battle: Add 1/4 cup distilled water to both jars, starting with the label "S." Then add 1/4 tsp. of detergent to one jar and 1/4 tsp. of soap to the other. Close the jars and give 5 strong shakes to them at the same time. Which makes more bubbles, soap or detergent? Write down your observations.

3. Hard Water Bubble Battle: First, mix 1/2 cup of distilled water with 1/4 tsp. Epsom salt to make hard water, then pour your mixture into both jars starting with the labeled "H." Repeat Step 2 using the hard water. Which makes more bubbles, soap or detergent? Write down your observations.

4. Bonus Bubble Battle: Repeat the same experiment using your tap water. If you compare the bubbles to your previous results, do you think that the mineral content of your tap water is closer to hard or soft water?

### Clean-up:

All disposable materials can be thrown away in the regular trash.

# DATA SHEET

## BUBBLE BATTLE

| MATERIALS | OBSERVATIONS | BUBBLE BATTLE WINNER |
|---|---|---|
| Soft Water + Soap | | |
| Soft Water + Detergent | | |
| Hard Water + Soap | | |
| Hard Water + Detergent | | |